

09/98031  
JC13 Rec'd PCT/PTC 30 NOV 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :

Noriaki TAKAICHI : Attn: BOX PCT

Serial No. NEW : Docket No. 2001-1772A

Filed November 30, 2001 :

DISK MEMORY DEVICE, DATA  
PREREADING METHOD, AND  
RECORDING MEDIA

[Corresponding to PCT/JP01/02735  
Filed March 30, 2001]

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents,  
Washington, DC 20231

Sir:

Prior to examination of the above-referenced U.S. patent application please amend the application as follows:

IN THE CLAIMS

Please amend the claims as follows:

4. (Amended) A disk memory device as defined in Claim 2, wherein the prereading rule holding means holds a plurality of prereading rules; and when there are a prereading rule decided by the prereading rule decision means and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision means decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

5. (Amended) A disk memory device as defined in Claim 1, further comprising:

COMPUTER SYSTEM

A horizontal line is present on the right side of the page, extending from approximately y=590 to y=850.

a cache memory pointer holding means for holding an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored; and

a prereading startup judgement means for judging whether or not prereading of data is to be performed to leave at least several blocks of data which have already been transferred to the host device, on the cache memory, by employing the under-transfer address and the next preread data storage start address which are held by the cache memory pointer holding means.

6. (Amended) A disk memory device as defined in Claim 1, wherein:

the prereading startup means stores a plurality of preread data, which have successively been read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

10. (Amended) A data prereading method as defined in Claim 8, wherein:

when there are a prereading rule decided in the prereading rule decision step and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision step decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

11. (Amended) A data prereading method as defined in Claim 7, further comprising:

a prereading startup judgement step of judging whether or not prereading of data is to be performed to leave, on the cache memory, at least several blocks of data which have already been transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

12. (Amended) A data prereading method as defined in Claim 7, wherein:  
the prereading startup step stores a plurality of preread data which have been successively  
read out in the backward direction, successively into a backward-direction area in an address  
space on the cache memory.

16. (Amended) A recording medium as defined in Claim 14, wherein:  
in the data prereading method, when there are a prereading rule decided in the prereading  
rule decision step and a prereading rule which has been employed immediately before the decided  
prereading rule and, further, the prereading directions of these prereading rules are the same, the  
prereading area decision step decides the position and size of data to be preread on the disk  
memory medium by employing both of the prereading rules in combination

17. (Amended) A recording medium as defined in Claim 13, wherein the data  
prereading method further comprises:

a prereading startup judgement step of judging whether or not prereading of data is to be  
performed to leave, on the cache memory, at least several blocks of data which have already been  
transferred to the host device, by employing an under-transfer address indicating the position, on  
the cache memory, of data which is currently being transferred to the host device, and a next  
preread data storage start address indicating the position on the cache memory where next  
preread data is to be stored.

18. (Amended) A data prereading method as defined in Claim 13, wherein:  
in the data prereading method, the prereading startup step stores a plurality of preread  
data which have been successively read out in the backward direction, successively into a  
backward-direction area in an address space on the cache memory

**Please add the following new claims:**

19. A disk memory device as defined in Claim 3, wherein

the prereading rule holding means holds a plurality of prereading rules, and when there are a prereading rule decided by the prereading rule decision means and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision means decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

20. A disk memory device as defined in Claim 2, further comprising.

a cache memory pointer holding means for holding an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored; and

a prereading startup judgement means for judging whether or not prereading of data is to be performed to leave at least several blocks of data which have already been transferred to the host device, on the cache memory, by employing the under-transfer address and the next preread data storage start address which are held by the cache memory pointer holding means.

21. A disk memory device as defined in Claim 3, further comprising.

a cache memory pointer holding means for holding an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored, and

a prereading startup judgement means for judging whether or not prereading of data is to be performed to leave at least several blocks of data which have already been transferred to the host device, on the cache memory, by employing the under-transfer address and the next preread data storage start address which are held by the cache memory pointer holding means.

22. A disk memory device as defined in Claim 3, wherein.

DRAFT PCT/EP 2022/062265

the prereading startup means stores a plurality of preread data, which have successively been read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

23 A data prereading method as defined in Claim 9, wherein  
when there are a prereading rule decided in the prereading rule decision step and a  
prereading rule which has been employed immediately before the decided prereading rule and,  
further, the prereading directions of these prereading rules are the same, the prereading area  
decision step decides the position and size of data to be preread on the disk memory medium by  
employing both of the prereading rules in combination.

24. A data prereading method as defined in Claim 8, further comprising:  
a prereading startup judgement step of judging whether or not prereading of data is to be  
performed to leave, on the cache memory, at least several blocks of data which have already been  
transferred to the host device, by employing an under-transfer address indicating the position, on  
the cache memory, of data which is currently being transferred to the host device, and a next  
preread data storage start address indicating the position on the cache memory where next  
preread data is to be stored.

25. A data prereading method as defined in Claim 9, further comprising:  
a prereading startup judgement step of judging whether or not prereading of data is to be  
performed to leave, on the cache memory, at least several blocks of data which have already been  
transferred to the host device, by employing an under-transfer address indicating the position, on  
the cache memory, of data which is currently being transferred to the host device, and a next  
preread data storage start address indicating the position on the cache memory where next  
preread data is to be stored

26. A data prereading method as defined in Claim 9, wherein

DRAFT PENDING EXAMINER'S REVIEW

the prereading startup step stores a plurality of preread data which have been successively read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

27 A recording medium as defined in Claim 15, wherein:

in the data prereading method, when there are a prereading rule decided in the prereading rule decision step and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision step decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination

28. A recording medium as defined in Claim 14, wherein the data prereading method further comprises:

a prereading startup judgement step of judging whether or not prereading of data is to be performed to leave, on the cache memory, at least several blocks of data which have already been transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

29 A recording medium as defined in Claim 15, wherein the data prereading method further comprises:

a prereading startup judgement step of judging whether or not prereading of data is to be performed to leave, on the cache memory, at least several blocks of data which have already been transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

30      A data prereading method as defined in Claim 15, wherein:  
in the data prereading method, the prereading startup step stores a plurality of preread  
data which have been successively read out in the backward direction, successively into a  
backward-direction area in an address space on the cache memory.

**REMARKS**

The present Preliminary Amendment is submitted to delete the multiple dependency of the claims, thereby placing such claims in condition for examination and reducing the required PTO filing fee.

Attached hereto is a marked-up version of the changes made to the claims by the current Preliminary Amendment. The attached page is captioned "Version With Markings to Show Changes Made".

Respectfully submitted,

Noriaki TAKAICHI

By 

Nils E. Pedersen  
Registration No 33,145  
Attorney for Applicant

NEP/krl  
Washington, D.C. 20006-1021  
Telephone (202) 721-8200  
Facsimile (202) 721-8250  
November 30, 2001

PTO: MARKINGS ARE APPENDED  
TO THIS DOCUMENT.  
SEARCHED.....  
INDEXED.....  
MAILED.....  
FILED.....  
NOV 30 2001  
U.S. PATENT AND TRADEMARK OFFICE

Version with Markings to  
Show Changes Made

55

a continuity detection means for detecting a direction along which prereading of data is to be carried out, and an area-to-area distance which is an interval of data to be preread, on the basis of the read commands stored in the command history information storage means;

a prereading rule holding means for holding prereading rules for performing prereading of data;

a prereading rule decision means for deciding a prereading rule to be used for prereading of data, on the basis of the read commands, the data prereading direction and the area-to-area distance which are detected by the continuity detection means, and the prereading rules held by the prereading rule holding means;

a prereading area decision means for deciding the position and size of data to be preread on the disk memory medium, on the basis of the prereading rule decided by the prereading rule decision means;

a cache memory for holding preread data; and

a prereading startup means for reading the data to be preread, which is decided by the prereading area decision means, from the disk memory medium, and storing the data into the cache memory.

4. A disk memory device as defined in Claim 2 [or Claim 3],  
wherein:

the prereading rule holding means holds a plurality of

PCT/EP2001/002260

prereading rules; and

when there are a prereading rule decided by the prereading rule decision means and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision means decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

Claim 1

5. A disk memory device as defined in any of Claims 1 to 4,  
further comprising:

a cache memory pointer holding means for holding an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored; and

a prereading startup judgement means for judging whether or not prereading of data is to be performed to leave at least several blocks of data which have already been transferred to the host device, on the cache memory, by employing the under-transfer address and the next prered data storage start address which are held by the cache memory pointer holding means.

### Claim 1

6. A disk memory device as defined in any of Claims 1, 3 to 5,  
wherein:

the prereading startup means stores a plurality of preread data, which have successively been read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

7. A data prereading method comprising:

a continuity detection step of detecting a direction along which prereading of data is to be carried out, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host device;

a prereading area decision step of deciding the position and size of data to be preread on the disk memory medium, on the basis of the read commands and the data prereading direction detected in the continuity detection step; and

a prereading startup step of reading the data to be preread, which is decided in the prereading area decision step, from the disk memory medium, and storing the preread data in a cache memory which is a storage area for the preread data.

8. A data prereading method comprising:

a continuity detection step of detecting an area-to-area distance which is an interval of data to be preread, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host

to be used for prereading of data, on the basis of the read commands, the data prereading direction and the area-to-area distance which are detected in the continuity detection step, and prereading rules held by a prereading rule holding means which holds prereading rules for performing prereading of data;

a prereading area decision step of deciding the position and size of data to be preread on the disk memory medium, on the basis of the prereading rule to be used for prereading of data,

which is decided in the prereading rule decision step; and

a prereading startup step of reading the data to be preread corresponding to the position and size on the disk memory medium which are decided in the prereading area decision step, and storing the preread data into a cache memory which is a storage area for the preread data.

10. A data prereading method as defined in Claim 8 [or Claim 9], wherein:

when there are a prereading rule decided in the prereading rule decision step and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision step decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

*Claim 7*

11. A data prereading method as defined in any of Claims 7 to 10, further comprising:

a prereading startup judgement step of judging whether or not prereading of data is to be performed to leave, on the cache memory, at least several blocks of data which have already been transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

*Claim 7*

12. A data prereading method as defined in any of Claims 7, 9 to 11, wherein:

the prereading startup step stores a plurality of preread data which have been successively read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

13. A computer-readable recording medium on which a program for making a computer execute a data prereading method is recorded, said data prereading method comprising:

a continuity detection step of detecting a direction along which prereading of data is to be carried out, on the basis of read commands as information for reading data recorded on a disk memory medium, which read commands are received from a host

EINZIGARTIGES DOKUMENT

size of data to be preread on the disk memory medium, on the basis of the prereading rule to be used for prereading of data, which is decided in the prereading rule decision step; and

a prereading startup step of reading the data to be preread corresponding to the position and size on the disk memory medium which are decided in the prereading area decision step, and storing the preread data into a cache memory which is a storage area for the preread data.

PCT/EP2006/000650

16. A recording medium as defined in Claim 14 or Claim 15,

wherein:

in the data prereading method, when there are a prereading rule decided in the prereading rule decision step and a prereading rule which has been employed immediately before the decided prereading rule and, further, the prereading directions of these prereading rules are the same, the prereading area decision step decides the position and size of data to be preread on the disk memory medium by employing both of the prereading rules in combination.

Claim 13

17. A recording medium as defined in any of Claims 13 to 16,  
wherein the data prereading method further comprises:

a prereading startup judgement step of judging whether or not prereading of data is to be performed to leave, on the cache memory, at least several blocks of data which have already been

transferred to the host device, by employing an under-transfer address indicating the position, on the cache memory, of data which is currently being transferred to the host device, and a next preread data storage start address indicating the position on the cache memory where next preread data is to be stored.

Claim 13

18. A data prereading method as defined in any of Claims 13, 15 to 17, wherein:

in the data prereading method, the prereading startup step stores a plurality of preread data which have been successively read out in the backward direction, successively into a backward-direction area in an address space on the cache memory.

PE  
RE  
OR  
DE  
AD  
CO  
NS  
UN